Ozone Exceptional Event Supporting Documentation for 2008 Flagged Data

Purpose and request for concurrence

The purpose of this document is to provide technical evidence of data impacted by exception events, as defined in 40 CFR Parts 50 and 51, and to request that the United States Environmental Protection Agency (USEPA) concur with the South Carolina Department of Health and Environmental Control's (Department) findings and exclude data specified in Table 1 from future regulatory decisions.

Table 1: South Carolina 2008 Ozone concentrations requested for exclusion from future regulatory decisions.

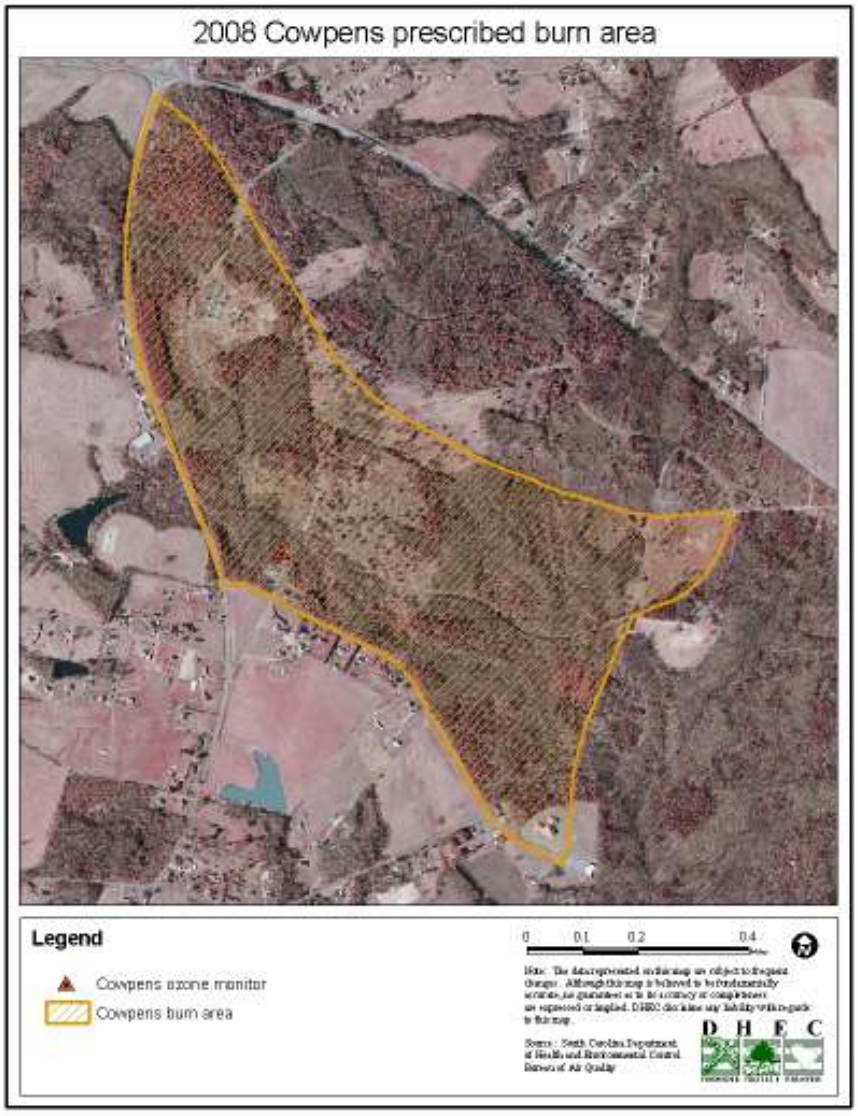
Date	Site ID	Site Name	Daily Maximum 8-hr Ozone Concentration
2/20/2008	45-021-0002	Cowpens	0.111 ppm

Cowpens Air Monitoring Site Ozone Exceedance February 20, 2008

The Cowpens monitoring site (45-021-0002) is operated by the South Carolina Department of Health and Environmental Control Division of Air Quality Analysis and is located in northern Cherokee County within the Cowpens National Battlefield. Periodically, the National Park Service conducts prescribed burns in the area near the Cowpens monitor to restore and maintain the fire-dependent vegetation. The benefits of the prescribed burns include restoration of the natural ecosystem.

National Park Service personnel conducted a prescribed burn in the northeast corner of the Cowpens National Battlefield on February 20, 2008. The purpose for the prescribed burn included reducing hazardous fuel, creating a more open savannah-like area, and to increase/perpetuate biotic diversity. The burn was conducted in accordance with the South Carolina Smoke Management Plan. Figure 1 indicates the location of the Cowpens monitor within the prescribed burn area. This prescribed burn, surrounding the monitor, resulted in abnormally high recorded ozone concentrations.

Figure 1: Cowpens National Battlefield Prescribed Burn Area



The Department has applied the most appropriate available qualifier to ozone measurements made on February 20, 2008 at the Cowpens monitor because the elevated Ozone concentrations were directly associated with impact of the adjacent and surrounding prescribed fire. An exceedance of the Ozone eight hour standard with a highest eight hour ozone concentration of 0.111 ppm was recorded as a direct result of the fire.

Figures 2 and 3 indicate the burned area around and right next to the building housing the ozone monitor. The burn area in both of these pictures shows that the fire was literally all around and immediately next to the Cowpens site.

Figure 2: Burn area around the Cowpens monitoring site

Figure 3: Burn area around the Cowpens site (second view)

The high ozone concentrations reported existed only in the immediate vicinity of the prescribed burn and measurements at all other area ozone monitors were significantly lower and consistent with what is typically recorded for the season and meteorological conditions. The graph below (Figure 4) illustrates the eight hour average ozone concentrations for all operating monitors in South Carolina from February 11 through February 24, 2008. On February 20, 2008, the Cowpens data shows the magnitude of the impact of the local fire with a spike upward, well above the standard.

Figure 4: Eight-hour ozone concentrations across South Carolina

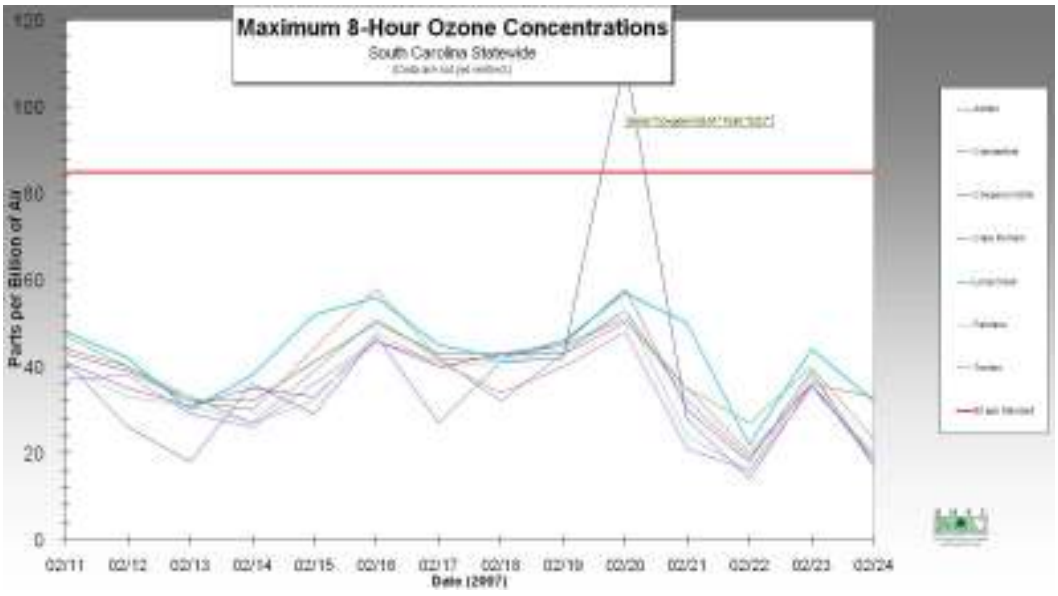


Table 2 shows the hourly ozone concentrations at the Cowpens monitor through out the day on February 20, 2008. For most of the day, the ozone concentrations at Cowpens were very low and typical of February ozone levels. The yellow shading in Table 2 shows a period of abnormally high ozone concentrations between hour 13 and hour 15. These extremely high levels of ozone occurred during the same time the prescribed burn was taking place next to the Cowpens monitor. There were no long or short term air stagnations, inversions, or meteorological events that contributed to the concentrations recorded at the site.

Table 2: Hourly ozone concentrations at the Cowpens monitor on February 20, 2008

Current Date : 02/21/08
Current Time : 09:08

Daily Data Report - Hourly Averages
Environmental Systems Corporation
02/20/08

Logger Id : CP Logger Name : COWPENS Interval : 0018

Param :	OZONE	BTEMP	RAIN
Units :	PPB	CELSI	INCHS
Hour			
00	33	22.0	.00
01	33	21.8	.00
02	33	21.9	.00
03	32C	22.2	.00
04	30C	22.2	.00
05	29	21.8	.00
06	26	22.1	.00
07	26	21.9	.00
08	30	21.6	.00
09	31	21.8	.00
10	D	22.3	.00
11	D	25.4	.00
12	D	24.7	.00
13	223H	24.9	.00
14	202H	25.1	.00
15	95	25.3	.00
16	50	25.0	.00
17	51	24.6	.00
18	47	24.1	.00
19	44	23.5	.00
20	47	22.8	.00
21	47	22.0	.00
22	43	21.9	.00
23	71	21.9	.00
Max :	223	25.4	.00
Min :	26	21.6	.00
Mean :	58	23.0	.00
Hours :	21	24	24

Data Flags : '<' - Less than ### Data, 'P' - Power Fail, 'D' - Disabled, 'T' - Out-of-Control, 'F' - Boiler Off-Line,
'B' - Bad Status, 'C' - Calibration, 'M' - Maintenance, 'O' - Analog Overrange, 'U' - Analog Underrange,
'A' - Arithmetic Error, '+' - Maximum, '-' - Minimum, 'R' - Rate of Change, 'H' - High-High Alarm,
'L' - Low-Low Alarm, 'h' - High Alarm, 'l' - Low Alarm, 'J' - High Rate of Change, 'j' - Low Rate of Change,
'V' - DIS #1 Obs, 'W' - DIS #2 Obs, 'X' - DIS #3 Obs, 'Y' - DIS #4 Obs, 'Z' - DIS #5 Obs,
'f' - Floor Exceeded, 'c' - Ceiling Exc.

All data at the Cowpens ambient monitoring site that has been determined to be significantly impacted by the prescribed burn, has been indicated in AQS through the application of the most appropriate available qualifier code. The impacted Ozone data has had the "E" (Forest Fire) data qualifier applied because AQS, for ozone, will not accept the "Q" qualifier code (Prescribed Burning), which we believe would be more appropriate.

The South Carolina Department of Health and Environmental Control Bureau of Air Quality is requesting concurrence from the US EPA, Region 4 that the affected Ozone data should be excluded from consideration for regulatory purposes. The ozone data

for which concurrence is requested meets all the criteria described in 40 CFR $50.14 for the Treatment of Air Quality Monitoring data influenced by exceptional events.

- The event affects air quality

The prescribed burn immediately adjacent to the ambient monitoring site had an immediate and significant impact on the pollutant concentrations at the site. The proximity, timing and the measurements of all parameters are consistent with direct impact of emissions associated with the activity. The prescribed burn was the direct cause of the exceedance of the National Ambient Air Quality Standard for Ozone recorded on February 20, 2008.

- The event was not reasonably controllable or preventable

Restoration and management of the Cowpens natural fire-dependent ecosystem requires the use of prescribed fire to achieve the resource management goals. Manual or mechanical methods of fuel reduction can be used where appropriate but the ecosystem is highly dependent on a natural fire return interval to maintain a sustainable natural species composition. The use of fire as a management tool in the National Battlefield is not reasonably controllable or preventable.

- The event was caused by human activity that is unlikely to recur at a particular location.

  Inherent in the definition of prescribed fire is the causal connection to human activity. Although the use of prescribed fire will continue to be necessary to the maintenance of the area around the Cowpens monitor, the historical record of monitoring within the area and the record of this event indicate that impact on air quality, and in particular on the ambient monitors, is rare, brief, easily identifiable, and most likely to occur when ambient concentrations are unlikely to be high and potential contribution to conclude that the type of impacts recorded on February 20, 2008 are unlikely to recur.

  E-mails received by SC DHEC, Division of Air Quality Analysis confirming prescribed burn

From: William Allen
To: Dennis, Steve C.
Date: 02/21/2008 09:41
Subject: Cowpens Ozone

Steve,

Yesterday at Cowpens they were doing some prescribed burning within 200 yards of the site.

William Allen
Division of Air Quality Analysis
Bureau of Environmental Services
SC DHEC

(803) 896-0926

From: <Kathy_McKay@nps.gov>
To: "Steve C. Dennis" <DENNISSC@dhec.sc.gov>
Date: 02/21/2008 14:47
Subject: last COWP burn plan
Attachments: Westside Burn 07_MR. For Tech Review.doc

The East-side Burn is the burn that was completed yesterday.

(See attached file: Westside Burn 07_MR. For Tech Review.doc)

Kathy McKay
Cowpens National Battlefield
864-461-2828